he had acquired by his study of the spectrum of blood, though the full light which it was destined to throw on the function of the blood-colouring matter was only recognised when Stokes published his paper "On the Reduction and Oxidation of the Colouring-matter of the Blood." Having described the beautiful experiments which he had performed after becoming acquainted with Hoppe's paper on the blood spectrum, Stokes stated the conclusions, which might legitimately be drawn from them in the following words: "We may infer from the facts above mentioned that the colouring-matter of blood, like indigo, is capable of existing in two states of oxidation, distinguishable by a difference of colour and a fundamental difference in the action of the spectrum. It may be made to pass from the more to the less oxidised state by the action of suitable reducing agents, and recovers its oxygen by absorption from the air."[1]

The new facts acquired by the combined use of chemical and optical methods at once explained a large number of facts. Hoppe-Seyler showed that carbonic oxide blood was distinguished from normal blood in being unacted upon by reducing agents, and thus placed a valuable test in the hands of the medical jurist called upon to investigate cases of death by charcoal fumes.[2] The explanation of the facts discovered by Claude Bernard and by Lothar Meyer was obvious—to wit, that carbonic oxide forms a compound with the blood-colouring matter, more stable than the oxygen compound, and in which apparently one molecule of CO has replaced O_2.

With the resources of spectrum analysis to aid him, Hoppe now devoted himself with energy to the investigation of the blood-colouring matter (which he named Haemoglobin [3]), showing how to separate and purify it by repeated crystallisation, determining its composition, studying personally, and, with the aid of his pupil Dybkowsky, its combinations with oxygen and with carbonic oxide, examining its products of decomposition, and showing its probable connections with certain other animal colouring matters.[4]

It would be impossible in this place to comment in detail on all Hoppe-Seyler's contributions to the chemistry of the blood-colouring matter; these constitute his highest claim to distinction, and will ever cause him to be remembered as having contributed most largely to our knowledge of the manner in which the respiratory exchanges of animals are effected.

Until he removed from Berlin to Tübingen, and for some time after, Hoppe-Seyler published his researches for the most part in Virchow's *Archiv*, some of his papers appearing, however, in Fresenius' *Zeitschrift*, in the *Annalen d. Chemie und Pharmacie*, and in the *Berichte* of the Chemical Society of Berlin. In 1866, however, he commenced the publication of the collected papers issuing from his laboratory, under the title of "Med.-Chemische Untersuchungen."[5] Four parts of this publication appeared, the last in 1871.

Hoppe-Seyler's Work in Strasburg, 1872–1895.

A proper estimate of Hoppe-Seyler's work would necessitate a careful review of the fine researches published by his pupils, for there can be no doubt that in his case, as in that of many of the most distinguished scientific men of Germany, the work of the master has often been credited to the pupil under whose name it has appeared. It is obvious, however, that it would be impossible, within the limits of such an article as the present one, to give an account, however brief, of the succession of valuable papers which issued from the new Physiologico-Chemical Institute of Strasburg. Two events in Hoppe-Seyler's scientific life in Strasburg cannot, however, be passed over, viz. the publication of his "Text-Book of Physiological Chemistry," and the foundation of the *Zeitschrift für Physiologische Chemie*. The first part of the "Text-Book of Physiological Chemistry" appeared in 1877, the second in 1878, the third in 1879, and the fourth in 1881. This work is of interest as giving Hoppe-Seyler's views of the chemical processes of the body; yet it neither achieved nor merited great success. Devoted though he was to work by which he unquestionably did much to advance both physiology and pathology, Hoppe-Seyler was essentially a chemist rather than a biologist; and when, as in his systematic treatise, he left chemical, to speculate on biological, questions, his weak points became very obvious.

This account of Hoppe-Seyler's work must close with a reference to the great service which he rendered to our branch of science by founding, in 1877–78, the *Zeitschrift für Physiologische Chemie*. From the first number to the last this periodical has maintained a high standard, and, besides containing the results of all the work done in the Strasburg Laboratory, it has received contributions from nearly all the prominent workers in physiological chemistry. In succession to Hoppe-Seyler, Professors Baumann and Kossel are, it is understood, to be the future editors of this journal.

ARTHUR GAMGEE

NOTES.

WE are informed that a biography of Prof. Huxley is being prepared by his son, Mr. Leonard Huxley, who will be greatly obliged if those who possess letters or other documents of interest will forward them to him at Charterhouse, Godalming. They will be carefully returned after being copied.

THE Committee of the Pasteur Institute have appointed Dr. Duclaux, formerly sub-director, to succeed M. Pasteur as director, and Dr. Roux to be sub-director of the Institute.

WE understand that the final interment of M. Pasteur in the Pasteur Institute will not take place on Friday, as had been intended, because the vault and part of the sculpture cannot be ready in time.

THE centenary celebrations of the Institute of France commenced as we went to press yesterday, and will terminate on Saturday by a visit to the fine chateau of Chantilly, where the associates and members will be received by the Duc d'Aumale. An account of the foundation and membership of the Institute appeared in these columns a few weeks ago, and we hope to give in our next issue a full description of the ceremonies now taking place.

A BRONZE portrait bust of Dr. Robert Brown was unveiled on Friday in his native town, Montrose, Forfarshire, at a reception held by the Provost, magistrates, and town council of Montrose. Beneath the bust is a tablet, with the following inscription:—"Robert Brown, D.C.L. Oxon., LL.D. Edinburgh, F.R.S. London, President of the Linnean Society, Member of the Institute of France. Born in this house 21st December, 1773; died in London 10th June, 1858. 'Botanicorum facile princeps,' Alex. Von Humboldt.'" A large number of distinguished botanists from all parts of the kingdom were present.

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[1] Prof. Stokes, F.R.S., "On the Reduction and Oxidation of the Colouring-matter of the Blood." *Proceedings* of the Royal Society, vol. xiii. (1864) p. 357, paragraph 8.

[2] Hoppe-Seyler, "Erkennung der Vergiftung mit Kohlenoxyd." Fresenius' *Zeitschrift*, vol. iii. (1864) p. 439. *Philosophical Magazine*, vol. xxx. (1865) p. 456.

[3] "Um Verwechselungen zu vermeiden nenne ich den Blutfabstoff Hämatoglobulin oder Hämoglobin," Virchow's *Archiv*, vol. xxix. (1864) p. 233.

[4] Hoppe-Seyler's "Beiträge zur Kenntniss des Blutes des Menschen und der Wirbelthiere"; "Med-Chem. Untersuchungen," pp. 169-214, 366-385, 523-550; "Zur Chemie des Blutes und seiner Bestandtheile," *ibid.*, pp. 29-300; Dybkowsky, "Einige Bestimmungen über die Quantität des mit dem Hämoglobinlose gebundenen Sauerstoffs," *ibid.*, p. 117-132.

[5] "Medicinisch-Chemische Untersuchungen aus dem Laboratorium für angewandte Chemie zu Tübingen herausgegeben, von Dr. Felix Hoppe-Seyler." Berlin, 1866.

Mr. P. H. Lawrence, whose name will be remembered by some students of mineralogy, but more widely in legal circles, died a few days ago. We have also to record the death of Prof. E. W. Blake, until lately professor of physics in Brown University; of Dr. E. F. Rogers, instructor in chemistry at Harvard University; of Prof. V. Rydberg, the Swedish archæologist; of Mr. H. W. V. Stuart, who devoted much attention to the study of Egypt and its monuments; of Father Hirst, the author of numerous contributions to archæology; and of Dr. F. M. Stapff, the geologist, while prospecting for gold in East Africa.

The sixth Congress of Medicine was opened at Rome on Tuesday by Dr. Baccelli, Minister of Public Instruction.

In addition to the papers, already notified in the usual way, to be read at the next meeting of the London Physical Society to-morrow, there will be read, if time permits, a paper "On the Magnetic Field of any Cylindrical Coil or Plane Circuit," by Mr. W. H. Everett.

The steamship *Windward*, which conveyed the members of the Jackson-Harmsworth Polar expedition to Franz Josef Land, arrived at Gravesend on Tuesday. It will be remembered that the *Windward* left the Thames in July 1894; she has brought back the records of the expedition from that date up to the beginning of July of this year. Mr. Jackson and his party remain in Franz Josef Land, and the vessel will return there, with stores, next June.

A Fine Art, Industrial and Maritime Exhibition will will be held in Cardiff in the spring and summer of 1896, under the patronage of Her Majesty the Queen. The general object of the exhibition is to illustrate the most recent progress in the sciences, arts, and manufactures, and not merely to be a popular show. The following is a list of the chief sections, and the number of square feet allotted to each:—Mining and mining appliances, 13,280; machinery, electricity, and local and general industries, 20,480; maritime, 8400; agriculture and horticulture, 7280; health, 5400; fine arts, 9600.

The annual exhibition of the South London Entomological and Natural History Society was held on Thursday last, and was much appreciated by the company who went to see the numerous interesting specimens arranged by the Committee. The Society has for its object the popularising of the study of natural history, and to promote this it holds bi-monthly meetings, at which papers are read, discussions take place, observations are communicated, and specimens shown and commented on. In the summer-time field meetings are held for the purpose of collecting and observing, and periodical exhibitions are promoted. The Society's rooms are at Hibernia Chambers, London Bridge, where a large library and typical collections are kept for members' reference, as well as a lantern for demonstration purposes. At present the number of members is about two hundred. The Secretary is Mr. Stanley Edwards, Kidbrooke Lodge, Blackheath, S.E.

Mr. D. Pidgeon, Letherhead, sends us an account of a curious effect apparently produced by lightning in the early morning of September 7. In a cottage on Cherkley Court estate, three or four tumblers were left standing over-night, mouth upright, on a shelf affixed to the wall of a small pantry, and about twelve inches from the window, which was open. In the morning one of these tumblers was found to have a crack completely round it, so that a ring of glass, having an uniform width of half an inch, could be cleanly and easily detached. This hoop of glass has been preserved to be a witness to the vagaries of electrical discharge. There seems little doubt that electricity had to do with the formation of the crack, for large shrubs, just outside the open window near which the glasses stood, were found to have been damaged by the lightning. It would be interesting to know whether the glass was empty or not, or whether it was wet up to the level of the crack.

The Harveian Oration was delivered on Friday last, at the Royal College of Physicians, by Dr. W. S. Church, who took for his subject "Harvey and the Rise of Physiology in England." For 239 years, with but few intermissions, the College has met in obedience to Harvey's direction to commemorate its benefactors. After referring to the long list of these, Dr. Church remarked that during the present year the College had received the magnificent endowment of £3000 to establish a triennial prize for the furtherance of original research on the prevention and cure of tuberculosis, the donor being Dr. Hermann Weber, who, in instituting the prize, joined the name of the late Dr. E. A. Parkes with his own. After the delivery of the oration, the Baly medal was presented by the President, Sir Russell Reynolds, to Dr. W. H. Gaskell, F.R.S., of Cambridge. The medal is awarded biennially to some person who has distinguished himself in the science of physiology; it was founded in 1866 by Dr. F. D. Dyster, "In Memoriam Gulielmi Baly, M.D.," and amongst the names of those who have since received it are those of Claude Bernard, Carl Ludwig, Darwin, Owen, Kitchen-Parker, and Brown-Séquard.

In connection with the proposal to change the name of the Boulevard de Vaugirard to Boulevard Pasteur, the Paris correspondent of the *Chemist and Druggist* points out that a Rue Pasteur already exists, while twenty-one other streets of Paris have been named after chemists. Of these fourteen were of French nationality, and include Chevreul, Gay-Lussac, Lavoisier, Raspail, &c. Davy figures as the sole English chemist, and the only other foreigner is the Swede Berzélius. The names of seven botanists appear on street corners, amongst which are Dupetit, Thouars, Jussieu and Linné. Nicholas Flamel, writer and alchemist, who flourished in the second half of the fourteenth century, has the distinction of being the most remote name connected with sciences after which the Parisians have called a street. Thirty-nine thoroughfares take their names from doctors and surgeons; amongst these figure Jenner and Vesale, the Belgian anatomist, the only two foreign names. We commend the French custom to English and municipal authorities at a loss for suitable street names. It may be thought a doubtful honour to have one's name handed down to posterity in this manner, but the custom serves to show that men of science are remembered in France in little as well as in great things.

The following statistics, from the *Zoologist*, with reference to the progeny of a female Manx Cat and an ordinary Tom Cat, are interesting. The successive litters consisted of three on each occasion, and the distribution of tails is shown in the table:—

	No tails.	Half tails.	Full tails.
1st litter	3	0	0
2nd ,,	2	1	0
3rd ,,	1	2	0
4th ,,	0	2	1
5th ,,	0	1	2
6th ,,	0	0	3

The gradual elimination of the tailless condition characteristic of Manx cats is singular, and well worth putting on record.

Very little detailed information exists as to the effect of wind and atmospheric pressure on the tides around the British Isles, but it is to be hoped that the Committee appointed at the recent meeting of the British Association will succeed in eliciting sufficient trustworthy data to enable some general law to be deduced for the guidance of navigators. The Committee consists of Prof. Vernon Harcourt, Prof. Unwin, Mr. G. F.

Deacon, and Mr. W. H. Wheeler (Secretary); and as it is desirous of obtaining information from as many ports as possible, we are asked to make its existence known. A printed form, showing the manner in which it is proposed to collect the tidal statistics, will be sent to any one who will render assistance to the Committee, by Mr. W. H. Wheeler, Boston, Lincolnshire, who will also be glad to receive records of tides affected by gales.

IN connection with the growth of orchids, writes Mr. J. H. Hart, in the October *Bulletin* of the Royal Botanic Gardens, Trinidad, it has been noticed that the presence of ants is apparently necessary to their maintaining a healthy condition; but whether this is in reality due to some action of the ant itself, or to some indirect cause, has not yet been proved, and investigations are needed to show what is the real influence the ant has upon the health of the plant. It has been suggested that the presence of stinging ants acts as a protection to the plants; but Mr. Hart is inclined to think, from recent investigations, that the benefit the ants confer on the plant are those of providing it with the mycelium of a fungus to cover its roots, which organism enables it to take up food which would be otherwise unattainable. It may be shown that the ants act as protectors to the plants, as well as providing them with a means of obtaining nutriment; but Mr. Hart believes it to be almost certain that the fungus which grows in the material they accumulate around the root plays a much more important part, by providing the plant with food material.

THE first number of what promises to be a useful serial publication has just reached us from the U.S. Weather Bureau. The periodical has for its name *Climate and Health*: it is edited, under the direction of Prof. W. L. Moore, the new chief of the Weather Bureau, by Dr. W. F. R. Phillips, and it is devoted to climatology in relation to health and disease. Tables are given showing, for one hundred selected stations, statistical information relative to atmospheric pressure, temperature, humidity, precipitation, wind, and sunshine; the relative prevalence of certain diseases; and the mortality from different causes, in each State. In addition to these statistics, all of which refer to the conditions during July of this year, the new publication contains charts showing the average pressure departures from the normal, ranges of pressure, prevailing winds, and normal wind directions for each week in the month, and similar charts to exhibit graphically the absolute and relative data referring to temperature, humidity, and precipitation. There is also a chart for each week showing the total mortality by States, and representing diagrammatically the average climatological conditions so far as determined by the mean temperature and humidities and the total amount of precipitation. The general aim of the Weather Bureau in this new field of work is to collect the meteorological and hygienic statistics considered by medical climatologists of the greatest correlative importance, and to publish them in a useful and instructive form. By showing the statistics of mortality and morbidity side by side with those of climate, new information as to connections between sickness and weather changes will probably be discovered.

THE *Psychological Review* for last month contains an interesting paper by Mr. R. Meade Bache, on "Reaction Time according to Race." He suggests that the higher intellectuality of civilised white races may have been gained at the sacrifice of quickness of response to sensory stimuli, and states that it is a matter of familiar observation that Negro children are quicker in their movements than the children of white folk. At his request Prof. Lightner Witmer made careful and exact observations on persons of the Caucasian, American Indian, and African (Negro) races. These are given in three tables. Taking response to auditory stimuli, for example, the order of quickness is (1) Indian, (2) African, (3) Caucasian, in the relation of 116·27 : 130 : 146·92; these being the reaction times in thousandths of a second. Although the numbers of individuals dealt with (not more than a dozen in each case) are small, the results are suggestive, and will no doubt lead to further investigation.

THE attention of those who are interested in the question of the inheritance of acquired characters may be drawn to a paper which Prof. Mark Baldwin contributed to *Science* (August 23, 1895), under the title "Consciousness and Evolution." Prof. Baldwin fails to see any great amount of truth in the claims of Mr. Spencer that intellectual progress in the race requires the hereditary transmission of acquired increments in mental faculty, and adopts the view advanced by Weismann in 1889, and taken up more or less independently by Mr. Ritchie and Mr. Kidd, that social advance is rather by tradition than by hereditary transmission. "Man," said Prof. Weismann, "availing himself of tradition, is able, in every part of the intellectual domain, to seize upon the acquirements of his ancestors at the point where they left them, and to pursue them further, finally himself leaving the results of his own experience and the knowledge acquired during his lifetime to his descendants, that they may carry on the same process." Prof. Baldwin seems to have reached this view independently, and his paper is well worth reading.

UNDER the extraordinary heading of "The Chemical Theory of Freedom of Will," Dr. W. Ostwald makes, in the *Leipziger Berichte*, some suggestive speculations upon the mechanical theory of the universe. That all the phenomena of nature, organic as well as inorganic, should be ultimately of a purely mechanical character, is contradicted by the science of energy. The theorems of energetics give the conditions under which any event takes place; they indicate which out of all the possible courses it will follow, and to what state of equilibrium it tends. All this does not involve the element of time, except in the case of kinetic energy. In the equations representing mechanical processes, time may be put as positive or negative without rendering them invalid. In other words, all purely mechanical processes are reversible, while natural processes are not. They have a forward and a backward aspect. Now there are processes in nature in which an agent influences the time during which a certain event takes place, without being itself affected in any way. This happens in all cases of catalysis, and the laws of catalytic action are as yet only very imperfectly understood. It is known, however, that the acceleration of the process is proportioned to the concentration of the catalyser. May not the human mind, the author argues, act upon matter somewhat in the manner of a catalyser, accelerating the chemical and mechanical processes associated with psychical activity without any expenditure of energy? This may be worth considering. But it must be remembered that the course of natural phenomena can be influenced in many ways without the expenditure of energy. An elastic missile rebounding from a rigid plane is a case in point, or a river flowing between its banks.

THE production of antiseptics appears to be more and more engaging the attention of the great German colour manufacturers, and yet another compound, rejoicing in the name of potassiumorthodinitrocresolate, has been introduced, which promises to prove of considerable service both to the brewer and to the horticulturist. Messrs. C. O. Harz and W. von Miller have published an account of their investigations with this substance—or *antinonnin*, as it is more generally called—in the *Muenchen Allgemeine Zeitung*, and it appears that a solution containing but one part in 1500 to 2000 parts of soap-water proves destructive to all common injurious parasites without any deleterious action on the plants. Prof. Aubry, the well-known director of the experimental brewing station in Munich, has examined its disinfectant action on yeast, and finds that the latter, when treated with antinonnin, remained for a long time in a fresh condition in the heated workrooms, whilst untreated yeast rapidly underwent decomposition. A closer examination showed that all the specimens exhibited destruction of bacteria, while the yeast itself proved resistant to even stronger solutions, up to 5 per cent. Numerous other experiments have been made with this substance, and so far it promises well, being also odourless and very inexpensive. Whether this new antiseptic will succeed in carrying out all that is hoped of it, remains to be seen; meanwhile it may be regarded as an interesting, and possibly important, contribution to our list of disinfectants.

MESSRS. MACMILLAN AND CO. will issue in the course of November a further instalment of their "Cambridge Natural History." The volume is mainly devoted to insects, being the first part of a complete treatise on the subject by Mr. David Sharp, F.R.S. Introductory sections on Peripatus and on Myriapods are contributed respectively by Mr. Adam Sedgwick, F.R.S., and by Mr. F. G. Sinclair. The volume is the fifth in the series, and will be followed at no long interval by the second volume, in which various contributors deal with worms and Polyzoa. The ninth volume, in which Mr. A. H. Evans treats of birds, may be expected before the end of next year. Among Messrs. Macmillan's announcements for next week, one of the most important is that of an exhaustive work on "The Structure and Development of the Mosses and Ferns" (Archegoniatæ), by Dr. D. H. Campbell.

WITHIN the past few days, a bulky bundle of new publications of the U.S. Geological Survey has been added to the many reports and memoirs of the Survey already lying on our table. The amount of work represented by these volumes is so exceedingly great, that limits of space prevent us from attempting to describe and discuss the ground covered in them. We propose, however, to give in an early issue a general account of the recent publications of the Survey, and content ourselves at present with the bare statement of the volumes received during this month. First of all, we have to acknowledge the receipt of the fourteeenth annual Report of the Survey, in two parts. Part 1 contains the report of Mr. J. W. Powell, the Director, on the operations of the Survey for the year ending June 30, 1893, and part 2 (a volume of six hundred pages) contains papers on geological subjects, among which we notice—the potable waters of Eastern United States; the natural mineral waters of the United States; measurements of river discharges; the laccolitic mountain groups of Colorado, Utah, and Arizona; the gold-silver veins of Ophir, California; geology of the Catoctin Belt; tertiary revolution in the topography of the Pacific Coast; the rocks of the Sierra Nevada; pre-Cambrian igneous rocks of the Unkar Terrane, Grand Cañon of the Colorado. Two monographs of the U.S. Geological Survey have been received, viz. vols. xxiii. and xxiv. The former deals with the "Geology of the Green Mountains in Massachusetts," by Messrs. R. Pumpelly, J. E. Wolff, and T. Nelson Dale; and the latter contains Prof. R. P. Whitfield's text and drawings of the Mollusca and Crustacea of the Miocene formations of New Jersey. Both these valuable monographs are profusely illustrated. Finally, *Bulletins* Nos. 118-122 of the Survey have come to hand. No. 118 is a geographical dictionary of New Jersey. The next *Bulletin* contains the results of a geological reconnaissance in North-west Wyoming, with special reference to economic resources; No. 120 is on the Devonian system of Eastern Pennsylvania and New York. No. 121 is a bibliography of North American palæontology for the years 1888-92, inclusive; and No. 122 contains the results of the primary triangulation executed by the Survey during the past twelve years—that is, since the commencement of work upon the topographic atlas of the United States. In conclusion, we wish only to remark that the gratitude of geologists is due to the United States Government for providing the funds to publish so many works, not only of national but also of international importance.

THE current number of the *Journal de Physique* contains a paper by MM. Abraham and Lemoine on the measurement of very high potentials by means of a modified attracted disc electrometer. Two forms of instrument are described, the one for standard measurements, and the other, which is of simple design, intended for measuring potentials up to 100,000 volts to within about one per cent. In the standard instrument, which resembles a modified Kelvin electrometer as designed by M. Baille, the movable disc is suspended from the beam of a short-beam balance, the extent of the movement being limited by stops. In order, when desired, to make the movement of the balance beam stable, an auxiliary knife-edge is placed below the chief knife-edge of the beam, and weights are placed in a pan suspended from this auxiliary knife-edge. The attracted disc is maintained centrally within the guard-ring by means of three fine fibres. The simplified form of electrometer is, however, the one which exhibits most novelty. In this instrument the attracted disc is carried by a rod attached to one arm of a Roberval's balance. The movements of the balance, which is limited by stops, is noted by means of a long pointer attached to one of the horizontal bars of the moving parts. Finally, the adjustments of the guard-ring and attracted disc are not made by means of a complicated system of adjusting screws, but by the simple bending of their supports. These supports are made of soft copper wire, and, in the case of the guard-ring, have an S shape. This manner of allowing for the adjustment of the parts of a piece of apparatus is one which will very often be found of use, and we may mention that lead wire is particularly well suited for the purpose. The authors have made a series of experiments to test what is the maximum distance between the attracted and attracting discs it is allowable to use, and find that the greatest distance to be equal to half the width of the guard-ring. In making their measurements, the authors have used a novel method of obtaining a high potential which should remain steady for some minutes. Their arrangement consists of an electrostatic electric machine driven at a uniform speed by a small motor. The poles of the machine are joined to two points, between which a continuous stream of sparks passes. One of these points is connected to earth, and the other by means of a poor conductor, such as cotton soaked in paraffin oil, to the inner coating of a Leyden jar. Under these circumstances it is found that the potential of the interior coating of the jar is very constant. Thus in a series of measurements recorded by the authors, the maximum change in six minutes amounted to only 1 part in 1000, the potential being about 20,000 volts.

THE additions to the Zoological Society's Gardens during the past week include a Mozambique Monkey (*Cercopithecus pygerythrus*, ♀) from East Africa, a Smith's Dwarf Lemur (*Microcebus smithi*) from Madagascar, presented by Mr. E. Dyer; a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mrs. Vernon Biden; a Polar Bear (*Ursus maritimus*, ♂) from Spitzbergen, presented by Mr. Arnold Pike; two Masked Parrakeets (*Pyrrhulopsis personata*) from the Fiji Islands, a Blue and Yellow Macaw (*Ara ararauna*) from South America, a Peregrine Falcon (*Falco peregrinus*, var. *Anatum*) from North America, a Night Heron (*Nycticorax* *griseus*), European, an Antarctic Skua (*Stercorarius antarcticus*) from the Antarctic Seas, presented by the Hon. Walter Rothschild; two Senegal Touracous (*Corythaix persa*) from West Africa, presented by Mr. I. J. Roberts; three Blackcaps (*Sylvia atricappilla*), a Nightingale (*Daulias luscinia*), British, presented by Mr. Poynter; a Wall Lizard (*Lacerta muralis*) from Sicily, presented by Mr. A. M. Amster; a Dwarf Chameleon (*Chamæleon pumilus*) from South Africa, presented by Mrs. S. Jackson; two Squirrel Monkeys (*Chrysothrix sciurea*) from Guiana, a Spotted Eagle (*Aquila nævia*) from India, three Weka Rails (*Ocydromus australis*), four Tuatera Lizards (*Sphenodon punctatus*) from New Zealand, deposited; two Grisons (*Galictis vettata*), a Coypu (*Myopotamus coypus*) from South America, two Western Boas (*Boa occidentalis*) from Paraguay, purchased.

OUR ASTRONOMICAL COLUMN.

SUN-SPOT OBSERVATIONS IN 1894.—In a *Separatabdruck aus der Vierteljahrschrift der Naturforschenden Gesellschaft in Zürich*, Jahrgang 4, 1895, Dr. A. Wolfer brings together some results relating to the sun-spot statistics made in Zürich and elsewhere for the year 1894. The pamphlet opens with a determination of the constants for reducing the observations of each observer to one scale.

The mean observed relative number of spots for 1894 came out as 78·0 as against 84·9 in 1893, showing a distinct decrease. The secondary variations were also very prominent during this year; further, between two very low minima there occurred a prominent maximum lasting from May to July. Nevertheless there was on the whole a general decrease, making it possible to determine the epoch of the last important maximum. Having plotted the relative number of observed sun-spots for the three years 1892–94, and connected them together, the smoothed curve indicated a maximum at 1894·0. The length of the elapsed period, that is, from maximum to maximum, became

$$1894{\cdot}0 - 1883{\cdot}9 = 10{\cdot}0,$$

and the interval between the last minimum and the present maximum

$$1894{\cdot}0 - 1889{\cdot}6 = 4{\cdot}4.$$

Dr. Wolfer makes a comparison of the sun-spot numbers with the variations of the magnetic declination. Here there seems to be a very good agreement, and the curves for both are very similar. The epoch of the maximum magnetic variation, independently determined, occurs in August 1893 or 1893·6, which coincides exactly with the secondary rise of the curve of relative spot numbers. This secondary rise in the curve occurs just before the time of maximum deduced from the smoothed curve, and suggests rather that the former date should represent the chief sun-spot maximum. Dr. Wolfer, however, is not of this opinion, and prefers to hold to the date gathered from the mean curve. The pamphlet concludes with a tabular statement of each of the observers' individual observations for the year 1894, together with reference to the literature.

PLANETARY PERTURBATIONS.—In No. 3312 of the *Astronomische Nachrichten*, Prof. A. Weiler gives another paper on the subject of long-period and secular perturbations. The particular case considered is that of the disturbance of a planet, having a mean motion approximately twice that of the disturbing planet, and is really a special case of the more general problem of perturbations already treated in earlier numbers of the same journal. We cannot indicate here the mathematical formulæ which are given, and much of which would be unintelligible without the earlier papers, but attention may be called to one of his results.

When the commensurability in the periods of the disturbed and disturbing planets becomes very close, that is if $\delta = 1 - 2\mu$ be very small, where μ is the ratio of the two mean motions, the series by which the perturbations are expressed is not convergent, and the problem is apparently insoluble. Such a result is inconsistent with the regularly observed motions of the planets, and therefore points to some error in the assumptions on which the solution of the problem is founded. This error Prof. Weiler traces to the treatment as constant of the semi-axis major of the disturbed planet's orbit. The justice of this remark is illustrated by a reference to the arrangement of the asteroids in space, whose distribution offers peculiarities explicable on the hypothesis that the mean daily motion is variable if the approximation to commensurability oversteps a definite limit. Taking a list of twenty-five asteroids, wherein the value of $\delta = 1 - 2\mu$ is less than one-fifteenth, he shows that none have a period giving a mean daily motion very approximately twice that of Jupiter (598″·3). The mean daily motion of these twenty-five lies between 562″·2 and 640″·2, but none come between 572″·6 and 614″·4; that is, the mean motions separate on both sides of twice that of Jupiter. The force of this illustration is somewhat impaired if the list be made to comprise those more recently discovered. The asteroids Nos. 332 and 381 have mean motions of 605″·5 and 613″·5, respectively, and it should further be remembered that in the whole list of asteroids, there are only five whose means approach the lower limit of 562″. This remark simply refers to the value of the illustration, not to the accuracy of the fact it is called in to support.

THE SYSTEM OF α CENTAURI.—The meridian measures of the positions of α_1 and α_2 Centauri, made at the Cape in 1879–1881 have been utilised by Mr. A. W. Roberts for a determination of the relative masses of the two stars, and other data connected with the system (*Ast. Nach.* No. 3313). The place of the centre of gravity for 1880 is given as R.A. 14h. 31m. 27·537s., declination − 60° 20′ 20″·63 ± 0″·13; proper motion in declination (1880) = + 0″·750 ± 0″·005; proper motion in R.A. (1880) = − 7″·291 ± 0″·032. For the relative masses of the two stars, the values derived are 51 to 49 ± 1/50 of the amount.

According to the results obtained by Mr. Roberts, α_2 Centauri is very slightly heavier than the sun, while α_1 is about two-hundredths lighter. Since α_2 is now between five and six times brighter than α_1, it must have by far the brighter surface. Taking a mean of the different values which have been obtained for the sun's brightness in relation to the stars, "it would appear that α_2 Centauri is as bright as our sun, while α_1 is about five times fainter. α_1 Centauri is accordingly some distance on the downward track from the dignity of a sun to that of an ordinary planet; while α_2 Centauri is, as regards light, size, and mass, a twin-brother of our sun." Spectroscopic observations will furnish another method for determining the relative masses, but, in order to improve on our present knowledge, the observations of velocities must be accurate to within one or two tenths of a mile per second.

HOLMES' COMET.—This comet, which has presented such peculiarities both in its physical structure and the form of its orbit as to make it one of the most remarkable comets of short period, has been made the subject of an elaborate investigation by Dr. H. J. Zwiers. Taking into account the action of Jupiter and Saturn, but neglecting that of the Earth, to which, owing to the great perihelion distance of the comet, it cannot make any close approach, Dr. Zwiers is led to fix the date of the next perihelion passage on April 27, 1899, and gives an ephemeris commencing on February 16, 1898, the earliest date at which a search is likely to be successful. The theoretical brilliancy is then 0·0063, and when last seen in 1893, the brilliancy was expressed by 0·0118. In April and May, when the comet will be well situated for observation in the southern hemisphere, this latter quantity will be exceeded, and will approach that, that the comet possessed in January 1893, when it underwent such a remarkable change in its appearance. If the comet retains its stellar-like character, the difficulty in detection will no doubt be increased, but an early discovery is eminently desirable.

ON THE HABITS OF THE KEA, THE SHEEP-EATING PARROT OF NEW ZEALAND.

THE kea, the mountain parrot of New Zealand (*Nestor notabilis*), has earned considerable notoriety from its remarkable habit of attacking living sheep. It is commonly stated that the natural food of this bird consists of insects, fruit, and berries; and that it has developed a taste for a carnivorous diet only during the last thirty years. Mr. Taylor White, however, has recently pointed out (*Zoologist*, August 1895) that the various statements on the habits of this bird have all been derived from second-hand information; and, as the habitat of the parrot is on the tops of Alpine ranges, owners of sheep and shepherds who